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The purpose of this study was to devise a volleyball wall volley test to measure volleying ability suitable for use with high school girls of varying skill levels. After preliminary research of the literature on volleyball, skill of volleying and wall volley tests, a two-line wall volley test was constructed.

Two parallel lines were placed on a smooth, unobstructed wall surface to serve as a target for the test. The line was placed at a distance of ten feet from the floor, the minimum height for a good set-up. A second line was placed seven feet, four and one-fourth inches from the floor, the official height of the net during a game.

The two-line wall volley test was administered to 334 high school girls enrolled in general physical education classes. Each student was given two thirty second trials on two different days.

Data for the two-line wall volley test were recorded by two scorers in order that test objectivity could be determined. One scorer was always the instructor, the other scorer was one of six student assistants.

Test reliability was determined by correlating the scores recorded on Day One with those recorded on Day Two using the Pearson Product Moment method of correlation.

The validity of the test was established by using the Pearson Product Moment method of correlation. The scores on the test were compared to the ratings of volleying performance.

The two-line wall volley test proved to be an objective and a reliable measure of the volley as a skill in volleyball. An objectivity coefficient of .87 was obtained. The reliability coefficients obtained were .84 when scores recorded by the instructor were used and .77 for those recorded by the student assistants.

On the basis of the data obtained in this study the following conclusions were drawn:

1. The two-line wall volley test places value on the height and control of the volley.
2. The two-line wall volley test was a statistically reliable and objective as well as administratively practical measure of volleying ability.
3. The reliability coefficient obtained by correlating the scores of Day One and Day Two for Scorer I indicates that this test may be scored reliably by one scorer.
4. The low validity coefficients, .51 to .62, would appear to indicate that test had a poor predictive value. It may, however, be of value as a practice test and a motivational device for students.

A TWO-LINE WALL VOLLEY TEST AS A MEASURE OF VOLLEYING ABILITY OF HIGH SCHOOL GIRLS

by

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CHAPTER I

INTRODUCTION AND STATEMENT OF PROBLEM

INTRODUCTION

The Game

Volleyball has grown from a game requiring relatively little skill to a highly competitive sport, where speed, strength, endurance and coordination are of the utmost importance. (13) It is one of the leading participant sports in Europe and Asia; its popularity in the United States has boomed since the addition of volleyball in the 1964 Olympic games. Volleyball can be adapted to the needs and ability of any participant. It is a universal game that can be modified at the elementary level, with a lenient interpretation of rules at the junior and senior high school level, and with strict observance of the technical rules at highly competitive levels. (13)

Volleyball is usually included in the physical education curricula of high schools. It requires relatively little, inexpensive equipment. It can be played indoors or outdoors and can be enjoyed by beginners as well as advanced players.

The Volley

The volley is the fundamental technique or skill of volleyball. Barnes (3) found the volley to be used more than any other

technique in the game. It must be mastered by any player who desires to play the game well. This technique allows the ball to be moved with more accuracy than any other play. Unless the volley is learned correctly the level of skill will remain low according to Anthony. (2) He goes on to state that the volley is used in general play, in controlling services, in receiving passes, in setting up, and in playing long high balls to the opponents' back court.

Trotter (16) calls the volley the basic ball handling skill of the game. The pass is the beginning of the attack, regardless of the offensive pattern of play developed by the team.

Evaluation

When volleyball is offered in school programs, some means of evaluating the aims and objectives of desired outcomes is needed. One method of evaluating the results of an instructional unit in volleyball is through skill testing. Scientifically constructed skill tests have been developed to measure ability in specific skills and in some sports, overall playing ability. However, many skill tests are not refined enough nor are they perfected to the extent that the teacher can depend totally upon these tests to accurately evaluate the true ability of a student. Clarke (5) states that

> . . . the progressive physical educator should view testing from both a liberal and critical standpoint. The liberal attitude will allow him to use the best available tests at the time, in hopes that through their greater use better tests will eventually result. (5:22)

A critical viewpoint will sharpen his awareness that there is a need for more scientifically constructed skill tests.

> The scientific construction of tests in the field of physical education is still so relatively recent that a willingness to use existing tests and to analyze them critically is essential to the growth of this movement and of the profession itself. (5:22)

Tests have been developed to measure the most important aspects of the game. In volleyball, a majority of the skill tests have been designed to measure a player's overall playing ability. Most of the tests have involved wall volley tests.

> All of the published studies of the construction of volleyball skill tests and batteries have one test in common, repeated volleys. This test has several variations but in all forms the player is scored according to the number of times he can volley the ball to the wall above a line within a specified time limit. (14:228)

An advanced player may be penalized when attempting to score well in a test that requires a player merely to keep the ball above a seven-foot, four and one-fourth inch (net height) line. (16) On the other hand, moving the line up to ten feet, the minimum height necessary for a good set-up (58), will result in the beginning players and perhaps as many as half of the intermediate players failing to score at all. Therefore, it seems logical to provide for all skill levels at the same time when testing the volleying ability of a group of varied skill levels.

By using both the ten-foot line and the seven-foot, four and one-fourth inch line on the wall at the same time, three target areas are possible for scoring: above the ten foot line, in between the ten-foot and the seven-foot, four and one-fourth inch

line and below the seven-foot, four and one-fourth inch line. Point values could be assigned to each area according to the value of this particular height in a game situation. It was to test this assumption that this study was undertaken.

STATEMENT OF THE PROBLEM

The purpose of this study was to devise a volleyball wall volley test to measure volleying ability that would be suitable for use with groups of varying skill levels. Two wall lines formed target areas used to provide for this factor. The objectivity, reliability and validity of this skill test were determined on data obtained from high school girls.

CHAPTER II

REVIEW OF LITERATURE

The literature reviewed for this study is discussed in four sections. The first of these is concerned with the game of volleyball. The second section deals with the volley as a skill or technique in the game. The third section is concerned with the components of a good volley. The final discussion reviews volleyball wall volley tests.

Game of Volleyball

> Volleyball was originated in 1895 at the Y.M.C.A. in Holyoke, Massachusetts. The director, William G. Morgan, wanted to give businessmen an opportunity to exercise indoors with a game less strenuous than the popular game of basketball. (15:1)

Geisler (28) said volleyball is the most popular and most widely played sport in the United States. Scates (13) wrote that volleyball is a universal game that can adapt to the needs and ability of any participant. "Volleyball is an ideal sport for intramural programs and is probably the best co-recreational sport available at present." (11:450) Volleyball courts are appearing almost everywhere from backyards to parks, playgrounds, beaches and schools. Countless numbers of people play the game on a recreational basis every day. Recreational departments, schools and businesses have included volleyball in their activity programs.

The Volley

The set is considered by many volleyball experts as being the one skill most often used in the game. (2, 3, 7, 9, 12, 13, 15, 16, 17, 18, 34) According to Barnes, "the fundamental technique involved in volleyball is the overhand (chest) pass which is used when the ball is chest level or higher." (3:438) Thigpen agrees as is evident by the following quote, "the chest pass probably is used more than any other technique in the game of volleyball. It must be mastered by any player who desires to play the game well." (15:38)

A large amount of the teaching-learning time in volleyball should be devoted to ball handling skill (passing and setting). Without mastery of ball handling, wrote McManama (34), the game lags as serving dominates play, spiking and blocking become impossible to perform, and the game becomes dull and noncompetitive. He stressed the purpose of the set as being able to set the spiker perfectly. Baley (18) insisted that since a good set-up is a prerequisite to a good spike, students should spend time in practice on the set-up. "The pass, which is the first touch of the ball on the receiving side, puts the defensive team on the offensive." (13:13)

The Components of a Good Volley

Scates (13), in his description of the volley, stressed feet being in a stride parallel position, knees slightly bent, the trunk erect, the weight on the balls of the feet, the hands

up, and the eyes on the ball. Contact should be made just above and in front of the eyes with the fleshy part of the last finger joint. Hands and arms should be extended.

Barnes (3) stated that the hands should be in front on the eyes with the thumbs together to form a triangle. The wrists should be hyperextended and the wrists and hands rotated inwardly. Elbows are flexed at shoulder height. A set-up should propel the ball as high as possible but with accuracy. A pass should be high and in a forward direction to allow the receiver enough time to get under the ball in order to handle it more easily. Miller and Ley (11), in discussing height of the pass, set the highest point at eight to ten feet from the floor or four feet above the passer's head. They indicated that in feeding a ball to a teammate, the arc of the flight should be at least as high as the net, which is seven feet, four and one-fourth inches.

Laveaga (9) sets the minimum height of the pass at fifteen feet although he emphasized that there is a disagreement on how high is high enough. However, there must be some minimum height for good performance. The ball must reach the receiver; so, therefore, a horizontal distance must also be measured.

Regardless of the height indicated by authorities (3, 9, 11), they all stressed the necessity of getting the ball higher. Those who indicated a specific height suggested that the ball be at least four feet above a player's head. For the average high school student, this minimum height would be between nine and ten feet.

Volleyball Wall Volley Tests

Cheesman (47) discussed the wall volley type tests and stated numerous advantages for the use of the wall volley test in physical education: it is objective, it is highly reliable, it has a fair degree of validity, it required very little equipment, and, therefore, is inexpensive and comparitively easy to administer.

French and Cooper (26) studied the skill elements in the game of volleyball and formulated four different tests: the repeated volley, a serving test, a set-up and pass test, and a recovery from the net test. The wall volley test proved to be the best of the four. The French and Cooper wall volley test used a wall line seven-foot, six inches from the floor and a restraining line three feet from the wall. Ten trials of fifteen seconds each were given. Scores were the sum of the five best trials out of the ten. The reliability coefficient for the repeated volley test was .78.

Four trained judges were used to rate the playing ability of the 227 high school girls tested. The correlation coefficient of judges' ratings with test scores for forty-seven girls yielded a validity coefficient of .72 and .43 for 180 girls.

Bassett and Glassow (19) used a seven-foot, six inch wall line and a six-foot restraining line as markings for their version of the wall volley test. They used a tin strip on the wall for the wall line. A point was scored for each volley that resulted in the ball contacting the wall above the line. One point was

deducted for each new ball used and when any foul, such as holding or lifting was committed. Because the restraining line was ignored after the ball was put in play at the start of the test, the necessity for a restraining line was questioned.

Three trials of thirty seconds each were given. Scores were the sum of the three trials. Expert judges were used to rate the college students on overall playing ability. The correlation coefficient of judges' ratings with test scores for 119 women yielded a validity coefficient of .51.

Russell and Lange (39) also worked with a seven-foot, six inch wall line, but used a three-foot, a five-foot line and a seven-foot restraining line. Three trials of thirty seconds each were given at each distance over a three month period. The reliability coefficients reported were .87 for the best of three trials and .90 for the sum of the three trials.

Seven judges in all were used to rate the playing ability of the subjects. The correlation coefficient of judges' ratings with the test scores yielded a validity coefficient of .67. The authors noted that one judge thoroughly familiar with the players might be as good for subjective rating as several less familiar judges.

Crogen (24) conducted a study in 1943 in which a seven-foot, six inch wall line and a six-foot restraining line were used to start the test. After putting the ball in play, the subjects were allowed to ignore the restraining line. Three trials were given with no time limit. A trial consisted of hitting the ball

ten times against the wall. The reliability coefficient obtained was .48. For a twenty hit test the reliability coefficient was projected to be .83. The validity was calculated utilizing the ability to play volleyball in a competitive situation as the criterion. Teams with higher scores did better than those with lower scores.

In his test, Brady (20) used an eleven-foot, six inch wall line and no restraining line. Two trials of one minute each were given to each subject at five minute intervals with the score being the sum of the two trials. This yielded a reliability coefficient of .93. Four judges were used to rate the playing ability of the 627 college men. The data yielded a validity coefficient of .86. The test was not as valid for students below the college level as it was for those above. Brady (20) concluded that practice on the volleying tests improves not only the score made, but also tends to improve the individual's ability to play volleyball.

Lamp (31) used the French and Cooper wall volley test with 806 junior high school students and obtained a reliability coefficient of .64, based upon the test and re-test method. A validity coefficient of .72 was obtained. Lamp studied the correlation of the subjects' height with their scores on the test. The resulting correlation coefficients were .64 for 377 boys and .47 for 429 girls.

In their study of the wall volley test, Mohr and Haverstick (36) used a seven-foot, six inch wall line and three different

restraining lines at distances of three, five and seven feet. Three trials of thirty seconds each were administered beyond each restraining line. Scores were the sum of the three trials. Three judges were used to rate the playing ability of the 110 college girls tested.

The correlation coefficient of judges' ratings with test scores for the one hundred girls yielded validity coefficient from .81 to .83. Mohr and Haverstick (36) found that as a result of moving the restraining line back from the wall to five feet and seven feet, the players used more set-ups prior to each volley, and their performance involved more body movement than at the three-foot restraining line. The reliability coefficient at the three-foot line was .81, at the five foot line .81, and at the seven-foot line .83.

Cheesman (47) used the same wall volley tests as Mohr and Haverstick. She administered test trials at restraining lines of three, five and seven feet. Each of the three trials for each of the tests were, however, reduced to fifteen seconds in length. Reliabilities ranged from .76 to .98 for the varying distances. Validities were relatively low, averaging around .50.

West (58) completed a study comparing the relationship between height and performance on wall volley tests. She hypothesized that if the wall volley tests were to be used to rate all types of players, every type of player should be included in the process of standardization. She, therefore, used a total of 231 subjects composed of junior high girls, graduate students and members of an expert team from Florida. She gave each of the

subjects three separate tests. Two were similar to those used in previous studies. Russell and Lange's two tests with a seven-foot, six inch wall line and the restraining line at three feet and at seven feet distances.

Each subject was given three, fifteen second trials at each distance. The third test was modeled after the Brady test. (20) Due to the lower line on the wall, it was assumed that the testee would have to be more accurate to score a hit. Only two trials of thirty seconds each were given. To prevent learning from influencing the scores, a rotational design was used. The reliability coefficient, .98, indicated a high degree of consistency.

The correlation coefficient of judges' ratings of performance with test scores for the 214 subjects yielded a validity coefficient of .83. A total of nine judges using a five point scale did the rating. Each group had at least one judge who knew the ability of the group.

Clifton (23) did a study in 1962 which used a seven-foot, six inch wall line and two restraining lines - one at five feet and one at seven feet. The reason for this study was a change in rules from two hits to a single hit by each player. Two trials of thirty seconds each were given at each distance. Scores were the sum of the two trials and yielded a reliability coefficient of .83. Five judges were used to rate the performance of the forty-five subjects in volleying in a volleyball game.

The correlation coefficient of judges' ratings with test scores for the forty-five women yielded a validity coefficient of

.70. The conclusions that were reached were that the test was a valid and reliable measure of volleying ability of college women students if it is administered at the seven-foot line and the sum of the trials are used as the total score.

In 1963 Liba and Stauff (33) constructed a skill test that did not make use of the wall. They wanted to develop a test for the overhead volleyball pass. They stated that such a pass should be high and in a forward direction, allowing the receiver enough time to get under the ball in order to handle it more easily.

The vertical height was measured by ropes and the distance and placement by a floor target. The ropes were suspended at heights of thirteen and eleven feet located 10.5 feet away from a restraining line. A target was used to determine the horizontal distance that the ball travels. The target consisted of a canvas strip two feet by thirty feet placed so that the center of the target was at the desired landing point.

Jones (52) used a battery of tests with adult males. The tests included serving, setting up and spiking. Scores were converted to standard scores. The validity coefficient, using judges' rating as the criterion, was .42 and .81 when tournament scores served as the criterion.

Trotter (16) described a test purported to measure the volleying ability of the intermediate and advanced player at the senior high school and college levels. Emphasis was given in the test to volleys that met standards high enough to qualify as sets for the spiker as distinguished from those that met minimum game

requirements: namely, height of the net. Therefore, the player who attempts the most desirable type of volley is not penalized as is often true on the tests requiring only minimum height.

Trotter (16) suggested a ten-foot wall line and a seven-foot, four and one-fourth wall line. Two points were given for each volley above the ten-foot line and one point given for each volley between the two lines. The subject's score was the highest consecutive interval within the trial. One trial of one minute duration was given. No data concerning either the validity or reliability of the test were given.

Chaney (46) undertook a study in an attempt to develop a test of volleyball ability for college women. She used 143 subjects and had them volley against a wall over a ten-foot wall line. No foot restraining line was used. The reliability coefficient found was .88 and validity coefficient obtained from a comparison with scores on the Clifton Single Hit Volley test (23) was .73.

Johnson (51) developed a test for high school girls. She gave six trials of the Johnson overhead volley to one hundred high school students. The reliability coefficient was .93 and the validity coefficient obtained from judges' ratings was .74. The validity coefficient obtained from a comparison with scores on the French and Cooper (26) repeated wall volley test was .68.

Kronquist (30) used a modification of the Brady test for high school boys. He stated the following were critical parts of a test of this type:

1. Use of a restraining line, and if used, where it should be placed.
2. The height of the line on a wall, on or above which it should be placed.
3. The use of a target area on the wall and if used its size.
4. The time limit for each trial and number of trials. (14:26)

Cunningham and Garrison (25) used a ten-foot wall line and no restraining line in their test. Two trials of thirty seconds each were given. Scores were the sum of the two trials. Four judges were used to rate the playing ability of the 111 college students. The correlation coefficient of judges' ratings with test scores for the 111 women yielded a validity coefficient of .72.

The objectivity of judges' ratings was obtained by computing correlation coefficients between the scores of pairs of judges. The results were: Judge 1 with 2-.89, Judge 1 with 3-.83, and Judge 2 with 3-.87. The reliability coefficient obtained was .85.

While administering various tests over a period of many years, the authors observed that most of the tests did not meet the requirements they considered necessary in a test to measure total volleyball playing ability.

In this study the following items were attempted:

1. Minimize, but not eliminate the height factor;
2. Eliminate the restraining line, which usually is not a very important factor in the game;
3. Require subject to use footwork and judgement;
4. Require accurate placement of the volley. (25:486)

Summary

Volleyball is reported to be one of the most popular sports in the United States. The volley is so important to the game that the experts feel no one who really wants to play volleyball well can do so unless he knows how to volley. If the skill is that important to the game, teachers should be able to objectively evaluate their student's ability to volley.

Most of the tests constructed and published to date to test one's volleyball playing ability have been wall volley tests. There are many types of wall volley tests stated in the literature, dating from French and Cooper in 1937 to Cunningham and Garrison in 1968. The tests vary in their use of heights for the wall lines, distances for the restraining line and in the time interval and number of trials used. The criterion for test validation for most tests was overall playing ability as rated by judges.

While each of the tests previously described were satisfactory for the purpose for which they were designed, there still appears to be a need for a test suitable for use with high school girls, where the students are found to have a varying skill level and where the objective is to measure volleying ability.

CHAPTER III

PROCEDURE

The purpose of this study grew out of a need of the writer to evaluate the volleyball playing ability of large numbers of high school girls in a relatively short period of time with few trained assistants and little equipment.

Barnes (3) found the volley to be used more than any other technique in the game. It is both an offensive and defensive skill depending upon whether it is used in receiving a serve or in setting the ball up to a teammate for a spike. A review of skill tests designed to measure volleyball playing ability revealed that the most valid and reliable tests were those involving a volley against a wall. For these reasons it was decided to utilize some form of wall volley to measure playing ability with specific emphasis on the volley.

PILOT PROJECT

In the spring of 1970, an informal experiment was made in testing students by combining elements of two variations of wall volley tests. Since ten feet has been stated (58) as being the minimum height needed for a successful set, a wall line ten feet from the floor was used as the highest wall line. Three points were scored for each legal volley which hit above this

line. Seven feet, four and one-fourth inches from the floor was the height of a second wall line with two points being awarded for each legal volley hitting between the ten-foot line and the seven-foot, four and one-fourth inch line. One point was scored for any legal volley which hit below the seven-foot, four and one-fourth inch line. No floor restraining line was used. The need for a restraining line had been questioned in previous testing by Bassett (19) and since the raising of the wall line gives a lesser advantage to height in the mathematical and mechanical analysis (58), a restraining line was omitted.

The subjects for this phase of the study were one hundred girls between the ages of fourteen and eighteen years of age, who were enrolled in the physical education classes at St. Elizabeth Academy during the spring of 1970. These girls ranged in skill level from rank beginners, those who had had no background whatsoever in volleyball, to girls who competed on an interscholastic team.

The hybrid test seemed, from a subjective analysis, to measure volleying ability effectively. The better players, those who in game play executed the volley most effectively, made the best scores while those students categorized as the poorer performers had the lowest scores. However, the data were not analyzed statistically. This study was undertaken to determine if the test experimented with was objective, reliable, and valid.

THE STUDY

Description of the Test

Wall target. The wall space used as the testing area was an unobstructed area, twelve feet wide and twenty feet high. The wall surface was smooth and painted. The target consisted of two horizontal lines, one at a height ten feet above the floor and a second at a height of seven feet, four and one-fourth inches. An illustration of the target is shown in Figure 1, page 20.

Materials and equipment used. Several types of tape were tried on the wall to mark the two wall lines. Plain brown masking tape was used in the first experiment in the spring of 1970. Because the wall was colored a few shades lighter than the tape, it was difficult for the scorers and the subjects to see the lines.

Black electrician's tape was tried with the groups used to train the scorers. While this tape was very easy to see on the wall, it did not adhere satisfactorily.

Plain brown masking tape, two inches wide, was chosen as the best means of marking the target area. The tape was colored with black marking pen to increase visability.

The bottom edge of the tape was placed at the appropriate height mark. If the ball hit the tape line, the hit would be recorded in the higher section.

The balls used were Number One, Sport Craft leather covered balls weighing six pounds.

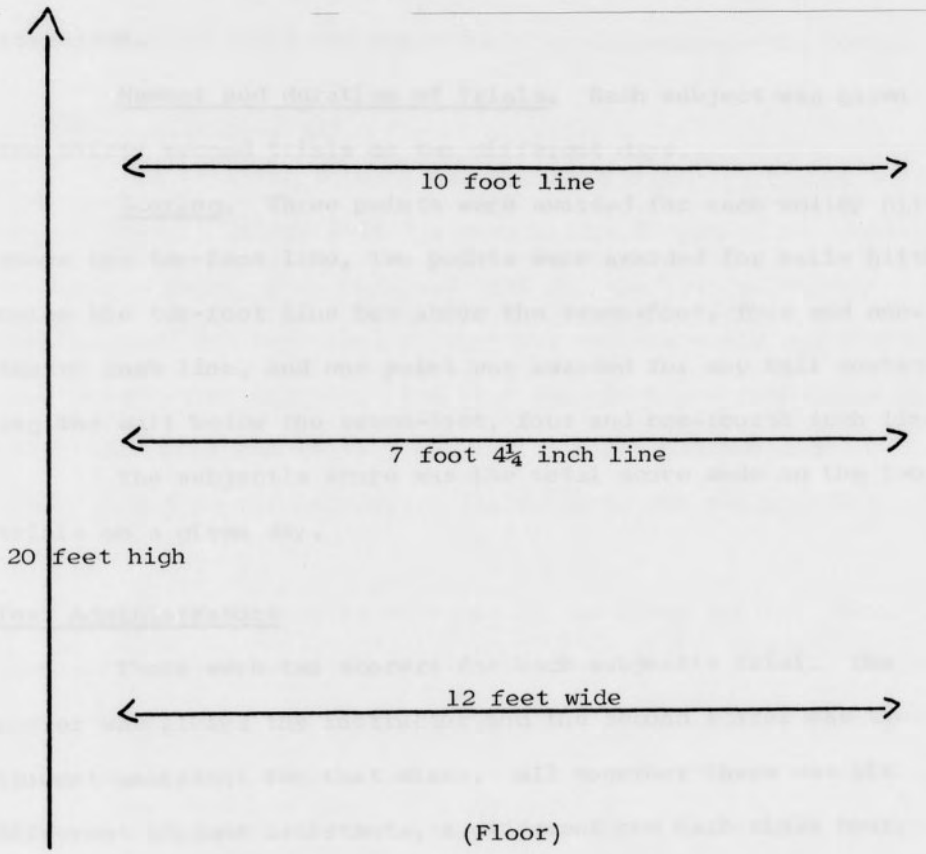

FIGURE 1

WALL TARGET

The one central timer used a Sport Craft thirty second stopwatch.

Number and duration of trials. Each subject was given two thirty second trials on two different days.

Scoring. Three points were awarded for each volley hitting above the ten-foot line, two points were awarded for balls hitting below the ten-foot line but above the seven-foot, four and one-fourth inch line, and one point was awarded for any ball contacting the wall below the seven-foot, four and one-fourth inch line.

The subject's score was the total score made on the two trials on a given day.

Test Administrators

There were two scorers for each subject's trial. One scorer was always the instructor and the second scorer was the student assistant for that class. All together there was six different student assistants, a different one each class hour. The instructor met with the assistants for three training sessions to demonstrate and to practice scoring the test. The assistants were above average in physical education skills and two of them were members of the varsity volleyball team.

Subjects

The subjects for this study were 334 girls between the ages of fourteen and eighteen years of age, who were enrolled in physical education classes at St. Elizabeth Academy during the fall semester of 1970. These girls ranged in skill level from

rank beginners, those who had had no background whatsoever in volleyball, to girls who competed on an interscholastic basis.

Administration of Tests

The students in each physical education class were told about the wall volley test the week before it was to be administered to them. The class was told why the test was being administered and were assured that the results would not affect their grade that quarter. The test was given one week after the volleyball unit had begun. The tests were explained and demonstrated to the students. The subjects did not practice the test.

When the students returned to the class the following week, they were administered the test. The scoresheets for the subject (Appendix A, page 45) were arranged in alphabetical order and the students were called over to the testing area three at a time. When one girl completed a trial, she would be instructed to have another come to take her place. When the subjects were not taking the test, they were playing in a game being officiated by a student assistant.

Each girl volleyed against the wall for thirty seconds for one trial and then returned to the game. When the entire class had been tested, the subjects were again asked to take their second thirty second trial. The test was readministered a week later.

Rating of Playing Ability

To establish the criterion for determining test validity, players were rated in a game situation. The class teams were constructed so that each team had a mixture of skill level, some advanced, some intermediate, and some beginning players.

Three judges were used to rate playing ability. The instructor, who was well acquainted with the subjects, served as the expert judge. Russell and Lange (39) reached an interesting conclusion that might apply here: one judge thoroughly familiar with the subjects is as good as several judges less familiar.

The other two judges were a student assistant and a varsity player. The judges practiced rating together during a varsity practice. The subjects were rated on eight different aspects of the game on a five point scale.

The items of the scale were:

1. ability to move quickly
2. ability to get the ball up in the air
3. ability to volley the ball with the finger tips
4. ability to set the ball to a teammate
5. ability to serve the ball legally
6. ability to play relaxed
7. ability to bump the ball
8. ability to spike the ball.

A rating of a five indicated that the subject always did the item; a rating of a four indicated that the subject usually did

the item; a rating of a three indicated that the subject sometimes did the item; a rating of a two indicated that the subject infrequently did the item; while a rating of a one indicated that the subject never did the item. A copy of the rating sheet used is included in the Appendix, page 47.

At the practice session with the varsity players, there was no problem in rating all of the players on all of the items. The play for the class situation was more difficult to evaluate, however.

Not every subject got a chance to perform all of the skills being rated. If she did, the skill may have been executed only once or twice which was not enough for the assistants to see and rate adequately. The assistants were told to leave a particular item blank if they felt they had not seen the skill enough to adequately rate it. When the rating sheets were examined, it was found that there were several items left blank for a number of the subjects. For this reason, a composite rating was based on the first four items on the rating sheet. These were the items that directly applied to the volley itself and every subject had been rated on these four items by all the raters. Had all eight items been rated it would have been possible to assume the ratings for each subject were an indication of the player's overall playing ability and a comparison would have been possible between volleying ability and overall playing ability.

TREATMENT OF DATA

Objectivity

Test objectivity was calculated on the basis of the scores recorded by two independent scorers. The scores were correlated by the Pearson Product Moment method to yield an objectivity coefficient.

Reliability

To determine test reliability, the data obtained from the first administration (the total score for two trials) were compared to those of the second administration. The Pearson Product Moment coefficients were computed from the raw data.

Validity

Validity coefficients were calculated by comparing the average of the three judges' ratings to the total scores for day one and by comparing the average of the three judges' ratings to the total scores for day two. Each Pearson Product Moment coefficient was computed from the raw data.

CHAPTER IV

ANALYSIS OF DATA

A wall volley test utilizing two wall lines, one at ten feet and one at seven feet, four and one-fourth inches, was administered to 334 high school girls enrolled in general physical education classes at St. Elizabeth Academy, St. Louis, Missouri, during the first semester of the 1970-1971 academic year. The test was administered during the second and third weeks of the instructional unit in volleyball. Each subject performed two thirty second trials of the wall volley test on two separate days.

Objectivity

Two scorers independently scored for the subjects on the wall volley test. The Pearson Product Moment method of correlation was used to determine the objectivity coefficient between the scorers. An objectivity coefficient of .87 was obtained when the scores of Scorer I were correlated with those of Scorer II. These data are presented in Table I, page 27.

Reliability

Data were recorded for each subject on each trial of the test. The total score for the two trials served as the subject's score. Data obtained from two separate administrations of the test were used in determining test reliabilities. These

TABLE I

OBJECTIVITY COEFFICIENT FOR A WALL VOLLEY TEST USING TWO WALL LINES
N = 334

Scorers	Objectivity
Scorer I - Scorer II	.87

reliability coefficients were calculated on data recorded by each scorer separately as well as that of the two scorers combined. The reliability coefficients ranged from .74 to .84. (See Table II, page 28)

Validities

The subjects were rated while playing in a volleyball game by three judges to establish the criterion for validating the wall volley test using two wall lines. The Pearson Product Moment method of correlation was used to calculate the validity coefficients. They were calculated on the basis of the average rating of the three judges with the scores of the different scorers separately and combined on the different testing days. The validity coefficients varied from .58 to .62, with the latter being the correlation based upon the scores of Scorer I and II on the first testing day. The data concerning the test validities may be found in Table III, page 29.

TABLE II

RELIABILITY COEFFICIENTS FOR A WALL VOLLEY SKILL TEST UTILIZING TWO WALL LINES
N = 334

Scorers	Reliability Coefficients
Scorer I	.84
Scorer II	.77
Scorer I and Scorer II	.74

TABLE III

VALIDITY COEFFICIENTS FOR
A WALL VOLLEY TEST

	Coefficients
Average of three judges compared to:	
Scorer I, Day One	.59
Scorer II, Day One	.59
Scorer I, Day Two	.59
Scorer II, Day Two	.61
Scorer I and II, Day One	.62
Scorer I and II, Day Two	.58

Interpretation of Data

From the data gathered on the wall volley test utilizing two wall lines from 334 high school girls, the objectivity, reliability and validity coefficients of the test were calculated.

The wall volley test utilizing two wall lines proved to be an objective test to score. Barrow and McGee have the following to say about objectivity: "Objectivity refers to the lack of any personal influence of the instructor on the test results. Objectivity is a measure of the worth of the scores." (4:45)

The objectivity coefficient was .87 and according to Barrow and McGee (4), this is an acceptable coefficient. This is to say that, "the motivation, clarity of directions, organization, scoring accuracy and the like provided by one instructor should not be so different from that given by another as to influence the scores appreciably." (4:45)

The raw data were converted into numerical score values. Each volley that was recorded as hitting above the ten-foot line scored three points; each volley that was tallied as hitting between the ten-foot line and the seven-foot, four and one-fourth inch line counted for two points; and each volley that was tallied as a hit below the seven-foot, four and one-fourth inch line counted for one point. The final score for each subject was the total score for the two trials.

The reliability coefficients were .84 for Scorer I and .77 for Scorer II, comparing scores made on two separate administrations of the test. The reliability coefficient obtained when the scores

of the two scorers were combined was .74. According to Barrow and McGee (4), reliability coefficients ranging from .80 to .89 are considered acceptable. Scott and French (14), stated from .75 to .85 is considered adequate for many purposes.

This would seem to indicate that a single scorer, the instructor, can administrate the two-line wall volley test and the scores should be a reliable measure of the subject's ability to volley.

Comparing the reliability coefficient obtained for a single scorer, .84, to the other reliability coefficients of wall volley tests found in the literature, it can be said that the single scorer coefficient is higher than six out of ten listed in Table IV, page 32.

The validity coefficients were low, varying from .58 to .62. Since the subjects were of mixed volleyball ability, it was difficult to rate them in the time allotted. Two of the raters, the student assistant and the volleyball varsity player, although trained, were inexperienced judges and had a hard time evaluating all eight items for all of the subjects. All of the subjects had time to perform and be rated on the first four items. These were concerned directly with the volley. Therefore, the evidence seems to say that the test could not have been validated for overall playing ability, but only on the subject's ability to volley the volleyball. Barrow and McGee define validity as, "the most important of the technical standards because it tests the honesty of a test." (4:39)

TABLE IV

COMPARISON OF RELIABILITY COEFFICIENTS OF VARIOUS WALL VOLLEY TESTS IN THE LITERATURE TO THE MULVIHILL TWO-LINE WALL VOLLEY TEST

Tests	Reliability Coefficients
Brady	.93
Johnson	.93
Chaney	.88
Russell and Lange	.87
Mulvihill	.84
Clifton	.83
Mohr and Haverstick	.81
French and Cooper	.78
Cheesman	.76 to .98
Lamp	.64
Crogen	.48, projected .83

According to Scott and French (14), a validity coefficient below .60 to .65 indicates poor predictive value. A low validity coefficient would indicate that the test is less than accurate in predicting the ability it was assumed to measure. However, some testing experts (14) indicate that if the test appears subjectively to have some merit and is shown to be highly reliable, it might make a very good practice test and serve the purpose of securing interest and effort from the students. Such would appear to be the case with this test.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

The purpose of this study was to devise a wall volley test to measure volleying ability suitable for use with high school girls of varying skill levels and to determine the objectivity, reliability and validity of this test. After preliminary research of the literature on volleyball, the volley and wall volley tests used in volleyball, a wall volley test with two wall lines was constructed.

The two-line wall volley test was administered to 334 high school students enrolled in general physical education classes at St. Elizabeth Academy in St. Louis, Missouri. These students had one week of instruction in volleyball prior to the testing period. Each subject was given two trials of thirty seconds each, on two separate days, one week apart. Each subject participated in a volleyball game one month after taking the wall volley test and was rated by three judges.

Two wall lines, one at ten feet and one at seven feet, four and one-fourth inches, were placed on an unobstructed wall with masking tape. Ten feet was chosen because it is the minimum height necessary to meet height standards to qualify as sets for the spiker

as distinguished from those that meet minimum game requirements: namely, the height of the second line, the height of the net. (58)

Using the data collected, an objectivity coefficient of .87 was obtained when the scores of Scorer I were correlated with those of Scorer II. Reliability coefficients were calculated on data recorded by each scorer separately as well as those of the two scorers combined. The reliability coefficients varied from .77 to .84 with the latter being the correlation based upon Day One compared to Day Two for Scorer I.

Four validity coefficients were obtained: one for each judge and the average for all three judges. The judges' ratings served as criterion for the test. The correlation coefficients were the result of comparing the student's test score to the judge's rating. The validity coefficients ranged from .58 to .62.

CONCLUSIONS

Within the limitations of this study, the following conclusions seem justified:

1. The two-line wall volley test places value on the height and control of the volley.
2. The low validity coefficients, .58 to .62, would appear to indicate that the test has a poor predictive value. It may, however, be of value as a practice test and a motivational device for students.
3. The two-line wall volley test was a statistically

reliable and objective as well as administratively practical, measure of volleyball volleying ability.

4. The reliability coefficient obtained by correlating the scores of Day One and Day Two for Scorer I indicates that this test may be scored reliably by one scorer who is familiar with the performers.

RECOMMENDATIONS

The author recommends for further research a repeat of the study of these modifications:

1. The scoring and judging all to be done by professional physical educators.
2. During the practice or training sessions the judges should rate subjects of a varying level of skill.
3. The rating session should be longer or extend over more than one rating session.
4. Validate the test using the following two methods: as a measure of volleyball volleying ability and as a measure of overall volleyball playing ability. Then compare the two methods used.

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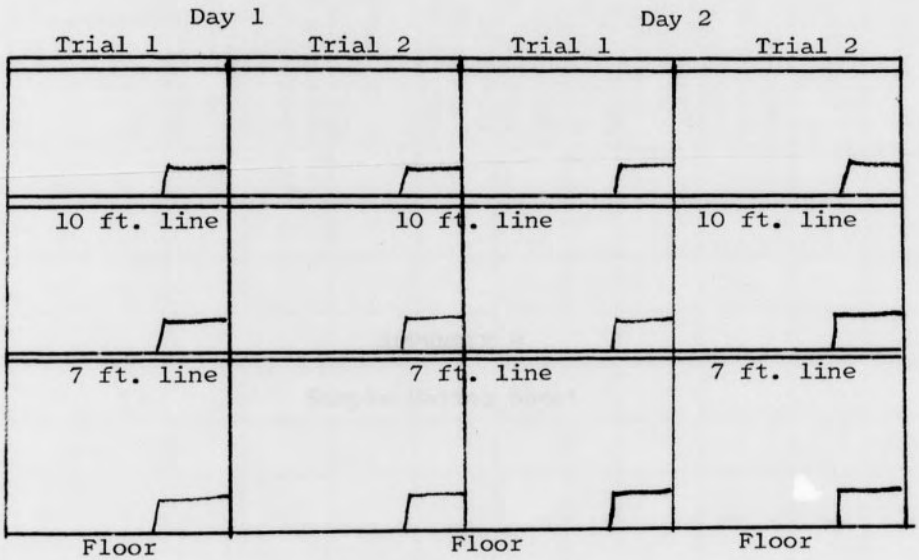
APPENDIXES

APPENDIX A

Sample Scoresheet

SAMPLE
SCORESHEET

Subject _____



Scorer _____

APPENDIX B

Sample Rating Sheet

SAMPLE RATING SHEET

Class _____ Rater _____ Name of Players	Footwork, Coordination, Balance	Ability to move quickly to meet ball and get up	Ability to volley with fingertips	Ability to volley or set to a teammate	Ability to use bump pass not underhand	Scoring power of serves	Understands team play, will anticipate	Ability to spike when given chance	TOTALS	AVERAGE

APPENDIX C

Raw Data

TABLE V

RAW DATA

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
1	39	78	14	34	117	48	9	7	8	8	53	112
2	116	118	120	114	234	234	17	15	16	16	236	232
3	128	103	134	109	231	243	17	18	16	17	262	212
4	129	105	132	118	234	250	18	20	20	19	261	223
5	114	129	113	128	243	241	18	20	17	18	227	257
6	109	141	95	141	250	236	17	15	20	17	204	282
7	118	116	124	128	234	252	16	17	18	17	242	244
8	127	122	104	136	249	240	16	15	18	16	231	258
9	122	107	133	132	229	265	18	20	20	19	255	239
10	116	131	106	143	247	249	14	16	17	16	222	274
11	26	10	47	16	36	63	11	11	13	12	73	26
12	33	31	23	14	64	37	8	9	8	8	56	45
13	10	29	26	37	39	63	15	13	12	13	36	66
14	30	23	29	24	53	53	14	10	12	12	59	47
15	23	53	14	19	76	33	10	9	12	10	37	72
16	17	18	49	29	35	78	8	9	10	9	66	47
17	16	25	21	51	41	72	13	13	14	13	37	76
18	34	29	23	27	63	50	10	12	12	11	57	56
19	23	8	38	48	31	86	11	13	14	13	61	56
20	13	27	45	33	40	78	12	10	11	11	58	60

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
21	11	6	26	12	17	38	11	10	12	11	37	18
22	14	25	11	6	39	17	16	12	10	13	25	31
23	4	6	32	16	10	48	12	12	13	12	36	22
24	8	16	27	8	24	35	12	9	6	9	35	24
25	13	23	14	9	36	23	9	9	10	9	27	32
26	16	8	24	15	24	39	11	10	12	11	40	23
27	26	31	7	6	57	13	9	10	11	10	33	37
28	30	16	18	8	46	26	8	10	8	9	48	24
29	16	16	23	18	32	41	12	12	13	12	39	34
30	15	-	43	17	15	60	7	8	9	8	58	17
31	16	18	25	17	34	42	14	12	15	14	41	35
32	8	24	41	6	32	47	8	9	7	8	49	30
33	36	2	24	19	38	43	12	10	12	11	60	21
34	8	11	43	21	19	64	13	12	10	12	51	32
35	18	10	16	39	28	55	9	10	11	10	34	49
36	27	32	14	15	59	29	8	8	9	8	41	47
37	11	25	21	37	36	58	14	13	12	13	32	62
38	16	15	40	24	31	64	9	9	10	9	56	39
39	19	10	41	25	29	66	11	10	11	11	60	35
40	40	14	55	29	54	84	7	10	9	9	95	43

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Subjects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instructor	Rating Varsity Player	Rating Assistant	Rating Average of 7, 8, & 9	Sum Day I Scorer I & II	Sum Day 2 Scorer I & II
41	31	24	52	32	55	84	13	15	14	14	83	56
42	18	53	17	53	71	70	15	16	17	16	35	106
43	15	34	29	55	49	84	8	6	7	7	44	89
44	30	39	20	44	69	64	13	12	10	12	50	83
45	14	14	56	51	28	107	11	10	12	11	70	65
46	25	29	51	31	54	82	17	15	16	16	76	60
47	26	22	37	51	48	88	11	9	10	10	63	73
48	44	35	36	21	79	57	10	10	12	11	80	56
49	35	16	45	41	51	86	15	16	18	16	80	57
50	4	3	2	1	7	3	10	9	8	9	6	4
51	2	2	6	2	4	8	9	7	10	9	8	4
52	2	4	2	6	6	8	11	10	9	10	4	10
53	4	6	7	-	10	7	4	6	5	5	11	6
54	2	14	-	4	16	4	9	8	7	8	2	18
55	-	10	13	-	10	13	4	4	4	4	13	10
56	2	8	2	16	10	18	6	7	8	7	4	24
57	2	-	32	4	2	36	8	10	6	8	34	4
58	19	18	8	-	37	8	6	6	7	6	27	18
59	14	5	17	12	19	29	12	8	10	10	31	17
60	8	13	10	23	21	33	8	6	7	7	18	36

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day I Scorer I & II	Sum Day 2 Scorer I & II
61	97	100	104	103	197	207	16	18	20	18	201	203
62	116	98	97	94	214	191	13	15	16	15	213	192
63	92	115	80	118	207	198	15	12	15	14	172	233
64	103	113	78	112	216	190	12	13	15	13	181	225
65	79	114	85	130	193	215	18	20	16	18	164	244
66	106	100	102	102	206	204	10	12	15	12	208	202
67	100	94	104	114	194	218	13	15	15	14	204	208
68	88	112	92	122	200	214	8	10	12	10	180	234
69	114	100	86	115	214	201	12	15	16	14	200	215
70	118	117	77	107	235	184	12	14	16	14	195	224
71	103	116	96	106	219	202	20	20	20	20	199	226
72	115	108	92	106	223	198	18	19	16	18	207	214
73	77	116	90	139	193	230	13	15	17	15	167	255
74	105	112	99	108	217	207	15	17	18	17	204	220
75	125	108	117	77	233	194	17	18	18	18	242	185
76	94	120	96	118	214	214	13	15	14	17	190	238
77	86	88	96	160	174	256	12	15	17	14	182	248
78	114	111	96	109	225	205	15	15	18	16	210	220
79	122	116	92	100	238	192	18	16	18	17	214	216
80	93	117	88	132	210	220	19	15	16	17	181	249

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day I Scorer I & II	Sum Day 2 Scorer I & II
81	109	94	115	114	203	229	11	12	16	13	224	208
82	130	86	117	100	216	217	19	15	16	17	247	186
83	120	94	109	112	214	221	12	13	15	13	229	206
84	92	118	115	114	210	229	13	15	17	15	207	232
85	65	129	104	143	194	247	16	14	17	16	169	272
86	121	75	145	103	196	248	20	18	17	18	266	178
87	103	103	113	126	206	239	13	15	16	15	216	229
88	98	113	108	129	211	237	15	16	15	15	206	242
89	101	116	112	122	217	234	17	15	15	16	213	238
90	105	118	111	128	223	239	15	17	19	17	216	236
91	115	128	95	125	243	220	15	16	17	16	210	253
92	102	106	128	129	208	257	18	20	19	19	230	235
93	103	127	113	123	230	236	8	19	12	13	216	250
94	102	127	101	137	229	238	16	17	18	17	203	264
95	83	83	94	124	166	218	14	16	18	16	177	207
96	101	94	96	93	195	189	18	19	20	19	197	187
97	88	100	83	95	193	178	14	15	17	15	171	195
98	95	79	108	109	174	217	13	15	16	15	203	188
99	98	75	107	113	173	220	9	10	12	10	205	188
100	95	102	102	95	197	197	14	15	16	15	197	197

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day I Scorer I & II	Sum Day 2 Scorer I & II
101	89	89	93	126	178	219	13	15	17	15	182	215
102	105	118	63	111	223	174	16	18	18	17	168	229
103	106	90	103	99	196	202	16	18	15	16	209	189
104	105	101	103	91	206	194	12	15	15	14	208	192
105	89	99	121	92	188	213	12	14	13	13	210	191
106	95	124	70	88	219	158	12	13	15	13	165	212
107	69	107	77	125	176	202	18	20	20	19	156	232
108	80	87	114	98	167	212	13	15	16	15	194	185
109	71	100	109	99	171	208	13	14	15	14	180	199
110	97	99	77	108	196	185	14	16	18	16	174	207
111	67	82	89	104	149	193	16	18	18	17	156	186
112	92	89	79	83	181	162	11	15	14	13	171	172
113	88	97	64	95	185	159	17	18	20	18	152	192
114	55	81	83	128	136	211	11	13	15	13	138	209
115	78	87	88	97	165	185	15	15	17	16	166	184
116	100	89	65	96	189	161	13	15	17	15	165	185
117	79	85	82	105	164	187	12	15	16	14	161	190
118	26	34	31	51	60	82	11	13	14	13	57	85
119	24	26	22	71	50	93	13	15	17	15	46	97
120	26	43	24	50	69	74	11	12	15	13	50	93

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day I Scorer I & II	Sum Day 2 Scorer I & II
121	17	30	40	57	47	97	13	15	16	15	57	87
122	20	21	51	53	41	104	12	13	15	13	71	74
123	35	28	41	41	63	82	15	15	16	15	76	69
124	18	29	46	58	47	104	11	10	9	10	64	87
125	8	45	13	88	53	101	17	15	16	16	21	133
126	27	39	45	47	66	92	11	10	9	10	72	86
127	28	49	23	58	77	81	12	10	10	11	51	107
128	51	12	60	39	63	99	10	11	12	11	111	51
129	24	31	70	37	55	107	12	13	15	13	94	68
130	38	43	42	40	81	82	11	10	9	10	80	83
131	40	4	53	66	44	119	11	8	9	9	93	70
132	27	45	42	49	72	91	9	8	7	8	69	94
133	57	20	57	30	77	87	10	9	8	9	114	50
134	50	71	28	15	121	43	12	10	9	10	78	86
135	39	78	14	34	117	48	9	9	7	8	53	112
136	14	22	41	88	36	129	12	10	10	11	55	110
137	63	27	44	33	90	77	12	9	7	9	107	60
138	27	29	39	73	56	112	11	10	9	10	66	102
139	33	30	74	38	63	112	12	10	9	10	107	68
140	48	20	62	47	68	109	12	10	9	10	110	67

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day I Scorer I & II	Sum Day 2 Scorer I & II
141	43	52	34	53	95	87	10	9	8	9	77	105
142	45	41	45	52	86	97	7	6	6	6	90	93
143	37	28	51	67	65	118	7	8	10	8	88	95
144	48	37	72	30	85	102	6	8	10	8	120	67
145	43	30	61	54	73	115	10	9	11	10	104	84
146	47	41	55	46	88	101	8	9	11	9	102	87
147	19	64	35	71	83	106	14	15	17	15	51	135
148	56	43	34	57	99	91	11	12	14	12	90	100
149	53	27	79	31	80	110	11	12	14	12	132	58
150	50	50	47	44	100	91	9	8	6	8	97	94
151	35	36	53	67	71	120	18	20	20	19	88	103
152	40	56	39	57	96	96	18	19	2i	19	79	113
153	20	45	56	72	65	128	12	13	15	13	76	117
154	47	31	67	48	78	115	11	13	14	13	114	79
155	6	41	65	82	47	147	6	7	9	7	71	123
156	53	28	58	55	81	113	8	7	7	7	111	83
157	42	42	49	61	84	110	10	12	13	12	91	103
158	23	55	49	68	78	117	12	14	15	14	72	123
159	37	25	63	73	62	136	13	14	15	11	100	98
160	19	51	40	88	70	128	8	9	11	9	59	139

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day I Scorer I & II	Sum Day 2 Scorer I & II
161	42	23	73	61	65	134	16	15	13	15	115	84
162	26	36	63	76	62	139	13	15	14	14	89	112
163	50	61	51	40	111	91	16	13	14	14	101	101
164	52	60	31	60	112	91	8	9	11	9	83	120
165	35	47	47	74	82	121	10	9	10	10	82	121
166	53	54	36	60	107	96	8	8	7	8	89	114
167	45	38	62	59	83	121	11	10	9	10	107	97
168	37	34	65	69	71	134	15	13	12	13	102	103
169	66	42	53	47	108	100	11	9	8	9	119	89
170	57	52	49	51	109	100	9	10	11	10	106	103
171	29	70	24	88	99	112	12	13	15	13	53	158
172	59	56	33	64	115	97	8	9	11	9	92	120
173	24	61	46	81	85	127	12	10	12	12	50	142
174	29	59	51	74	88	125	9	10	11	10	80	133
175	38	34	58	84	72	142	10	12	13	13	96	118
176	41	60	67	46	101	113	12	10	9	10	108	106
177	53	53	58	50	106	108	15	12	13	13	111	103
178	51	47	53	64	98	117	13	10	11	11	104	111
179	57	49	48	61	106	109	14	10	12	12	105	110
180	40	62	40	73	102	113	14	10	11	12	80	135

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
181	43	54	43	75	97	118	12	9	11	11	86	129
182	50	34	74	57	84	131	16	15	14	15	124	91
183	49	54	72	43	103	115	15	13	14	14	121	97
184	51	65	59	43	116	102	9	11	9	10	110	108
185	61	49	63	48	110	111	15	15	17	16	124	97
186	73	41	67	40	114	107	16	20	18	18	140	81
187	66	76	48	31	142	79	10	11	13	11	114	107
188	39	57	64	62	96	126	15	12	15	14	103	119
189	42	37	81	63	79	144	8	9	10	9	123	100
190	40	47	67	69	87	136	10	10	12	11	107	116
191	47	70	39	67	117	106	14	15	16	15	86	137
192	55	44	66	59	99	125	16	17	12	15	121	103
193	58	41	63	62	99	125	14	16	12	14	121	103
194	39	59	39	87	98	126	11	10	12	11	78	146
195	57	52	41	77	109	118	11	10	13	11	98	129
196	67	39	83	39	106	122	14	15	15	15	150	78
197	39	44	72	73	83	145	9	10	12	11	111	117
198	56	58	55	61	114	116	18	20	20	19	111	119
199	62	48	57	63	110	120	8	10	12	10	119	111
200	76	68	40	47	144	87	14	15	16	15	116	115

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
201	56	75	51	49	131	100	19	20	20	20	107	124
202	35	53	60	84	88	144	12	13	15	13	95	137
203	62	99	34	40	161	74	11	12	15	13	96	139
204	31	43	78	84	74	162	13	13	15	14	109	127
205	44	43	72	77	87	149	15	20	13	16	116	120
206	69	42	67	61	111	128	9	10	12	10	136	103
207	48	60	48	83	108	131	11	9	10	10	96	143
208	60	66	42	67	132	109	10	12	13	12	108	133
209	30	40	81	90	70	171	11	15	13	13	111	130
210	34	72	41	97	106	138	15	14	12	14	75	169
211	34	79	35	97	113	132	17	15	18	17	69	176
212	45	78	49	73	123	122	12	13	15	13	94	151
213	61	49	80	66	100	146	9	10	12	10	141	115
214	68	50	63	65	118	128	11	12	11	11	131	115
215	34	61	52	100	95	152	9	10	11	10	86	161
216	46	74	42	84	120	127	10	11	13	11	88	150
217	69	54	52	72	123	124	9	10	12	10	121	126
218	58	60	51	79	118	130	9	15	12	12	115	139
219	52	66	62	69	118	131	14	12	13	13	114	135
220	48	68	50	83	116	133	8	9	12	10	98	151

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
221	80	86	45	39	166	84	10	8	7	8	125	125
222	58	66	49	78	124	127	9	9	8	9	107	144
223	45	60	68	73	105	151	11	10	8	10	113	133
224	103	84	46	26	187	69	12	9	10	10	149	110
225	37	53	89	78	90	167	10	8	9	9	126	131
226	72	63	66	56	135	122	10	8	9	9	138	119
227	80	69	141	67	149	108	15	15	17	16	121	136
228	56	77	72	53	133	125	14	13	11	13	128	130
229	59	44	77	78	103	155	17	15	17	16	136	122
230	47	80	63	69	127	132	12	14	16	14	110	149
231	68	50	66	80	118	146	9	12	10	10	134	130
232	85	70	69	40	155	109	15	14	12	14	154	110
233	53	66	52	93	119	145	13	10	12	12	105	159
234	65	58	61	81	123	142	14	12	11	12	126	139
235	67	77	57	64	144	121	12	10	9	10	124	141
236	58	62	80	66	120	146	10	11	15	12	138	128
237	72	43	70	82	115	152	14	12	16	14	142	125
238	58	68	71	72	126	143	18	20	20	19	129	140
239	36	78	54	102	114	156	12	12	14	13	90	180
240	60	75	68	69	135	137	13	15	16	15	128	144

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
241	61	72	70	69	133	139	16	17	20	18	131	141
242	56	52	76	88	108	164	16	15	17	16	132	141
243	80	42	62	87	124	149	15	20	18	18	142	129
244	68	57	60	88	125	148	11	12	15	13	128	145
245	74	81	36	82	155	118	14	14	15	14	110	163
246	90	74	64	46	164	110	13	10	12	12	154	120
247	91	57	67	60	148	127	14	15	17	15	158	117
248	68	63	80	68	131	148	14	16	18	16	148	131
249	63	74	72	71	137	143	9	10	12	10	135	145
250	25	99	51	109	124	160	16	10	15	14	76	208
251	70	60	97	59	130	156	16	14	16	15	167	119
252	57	72	84	77	129	161	14	14	17	15	141	149
253	59	77	85	69	136	154	14	18	16	16	144	146
254	68	52	80	92	120	172	12	15	17	15	148	142
255	93	93	49	57	186	106	15	15	18	16	142	160
256	60	62	81	88	124	169	18	20	20	19	141	150
257	69	72	74	78	141	152	9	11	13	11	143	150
258	84	86	55	69	170	124	13	15	16	15	139	155
259	75	76	73	70	151	143	14	15	17	15	148	146
260	59	85	55	95	144	150	16	14	17	16	114	180

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
261	72	77	53	93	147	146	13	15	17	15	125	170
262	79	77	70	70	156	140	16	20	18	18	149	147
263	73	58	66	100	131	166	14	15	17	15	139	158
264	46	71	93	87	117	180	12	13	15	13	130	158
265	80	71	80	68	151	148	13	15	17	15	160	139
266	71	69	88	72	140	160	9	10	12	10	159	141
267	70	86	63	81	156	144	18	20	20	19	133	167
270	65	71	79	85	136	164	20	20	20	20	144	156
271	58	90	88	66	148	154	8	10	12	10	146	156
272	41	90	62	109	131	171	14	15	17	15	103	199
273	82	55	82	84	137	166	13	15	17	15	164	139
274	68	79	68	88	147	156	16	20	18	18	136	167
275	78	56	92	78	134	170	14	15	17	15	170	134
276	71	70	76	89	141	165	15	15	17	16	147	159
277	59	79	70	99	138	169	15	18	17	17	129	178
278	80	59	95	73	139	168	16	15	13	15	175	132
279	50	78	72	107	128	178	10	12	13	12	122	185
280	45	81	64	118	126	182	10	12	15	11	109	199

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
281	81	63	96	68	144	164	18	18	16	19	177	131
282	65	72	73	99	137	172	8	10	13	10	138	171
283	61	71	95	82	132	177	13	15	17	15	156	153
284	72	77	76	85	149	161	11	12	14	12	148	162
285	60	79	85	86	139	171	12	14	16	14	145	165
286	60	60	88	103	120	191	15	18	20	18	148	165
287	84	63	85	80	147	165	11	15	16	14	169	143
288	75	89	65	84	164	149	14	13	10	12	140	173
289	75	76	75	87	151	162	15	12	13	13	150	163
290	80	88	84	62	168	146	10	12	15	13	164	150
291	98	80	74	62	178	136	11	13	16	13	172	142
292	67	84	76	88	151	164	13	12	10	12	143	172
293	69	96	70	84	165	154	17	15	18	17	139	180
294	81	96	51	91	177	142	12	13	15	13	132	187
295	55	70	73	121	125	195	12	14	16	14	128	191
296	75	75	91	79	150	170	13	14	16	14	166	154
297	71	58	95	102	129	197	16	18	15	17	166	160
298	68	92	75	92	160	167	14	16	15	15	143	184
299	83	68	83	93	151	168	16	12	12	13	166	161
300	77	76	85	93	153	178	12	15	16	14	162	169

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Subjects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instructor	Rating Varsity Player	Rating Assistant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
301	88	80	93	72	168	165	8	10	12	10	181	152
302	56	102	59	119	158	178	16	15	16	16	115	221
303	123	49	80	84	172	164	17	18	20	18	203	133
304	77	94	65	101	172	166	16	15	12	14	142	195
305	103	97	70	68	200	138	12	13	15	13	173	165
306	82	91	81	86	173	167	16	18	15	16	163	177
307	100	69	99	74	169	173	10	12	15	12	199	143
308	24	33	22	41	57	63	9	10	11	10	46	74
309	36	8	36	45	44	81	10	10	12	11	72	53
310	15	37	26	49	52	75	10	11	12	11	41	86
311	8	33	43	44	41	87	8	9	10	9	51	77
312	35	38	27	30	73	57	13	12	11	12	62	68
313	12	19	46	54	31	100	20	16	15	18	58	73
314	31	30	38	34	61	72	6	7	8	7	69	64
315	97	85	88	83	182	171	12	15	16	14	185	168
316	84	84	88	97	168	185	16	17	18	17	172	181
317	91	97	83	82	188	165	16	18	20	18	174	179
318	97	95	79	83	192	162	15	20	18	18	176	178
319	100	78	90	96	178	186	16	17	19	17	190	174
320	89	105	73	97	194	170	15	16	17	16	162	202

TABLE V (continued)

Items	1	2	3	4	5	6	7	8	9	10	11	12
Sub-jects	Scorer I Day 1 & 2 One	Two	Scorer II Day 1 & 2 One	Two	Scorer I Total 1 & 2	Scorer II Total 3 & 4	Rating Instruc-tor	Rating Varsity Player	Rating Assist-ant	Rating Average of 7, 8, & 9	Sum Day 1 Scorer I & II	Sum Day 2 Scorer I & II
321	90	77	97	100	167	194	16	17	19	17	187	177
322	86	86	85	108	172	193	12	14	16	14	171	194
323	101	69	127	69	170	196	5	8	9	7	228	138
324	128	117	124	128	245	252	19	17	18	18	252	245
325	127	132	110	129	259	239	16	20	19	18	237	261
326	105	129	128	140	234	268	17	20	18	18	233	269
327	134	126	124	119	260	243	20	20	19	20	258	245
328	135	127	133	114	262	247	16	20	20	19	268	241
329	116	130	139	139	246	269	20	20	20	20	246	269
330	131	142	114	132	273	246	19	20	20	20	245	274
331	139	122	142	128	261	270	16	18	17	17	281	250
332	127	147	123	150	274	273	20	29	20	20	250	297
333	146	125	161	145	271	306	20	20	20	20	307	267
334	135	139	125	180	274	305	17	20	20	19	260	319